

The 'making of' national giants: technology and governments shaping the international expansion of oil companies from Brazil and China

Citation for published version (APA):

Carvalho, F., & Goldstein, A. (2008). *The 'making of' national giants: technology and governments shaping the international expansion of oil companies from Brazil and China*. UNU-MERIT, Maastricht Economic and Social Research and Training Centre on Innovation and Technology. UNU-MERIT Working Papers No. 021

Document status and date:

Published: 01/01/2008

Document Version:

Publisher's PDF, also known as Version of record

Please check the document version of this publication:

- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
- The final author version and the galley proof are versions of the publication after peer review.
- The final published version features the final layout of the paper including the volume, issue and page numbers.

[Link to publication](#)

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal.

If the publication is distributed under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license above, please follow below link for the End User Agreement:

www.umlib.nl/taverne-license

Take down policy

If you believe that this document breaches copyright please contact us at:

repository@maastrichtuniversity.nl

providing details and we will investigate your claim.

Download date: 05 May. 2023



**UNITED NATIONS
UNIVERSITY**

UNU-MERIT

#2008-021

Working Paper Series

**The ‘making of’ national giants: technology and governments shaping
the international expansion of oil companies from Brazil and China**

Flavia Carvalho and Andrea Goldstein

The ‘making of’ national giants: technology and governments shaping the international expansion of oil companies from Brazil and China*

Flavia Carvalho
(UNU-MERIT)

and

Andrea Goldstein
(OECD Development Centre)

Abstract

This chapter analyses foreign direct investments (henceforth FDI) in the oil industry from two large emerging economies, Brazil and China, with the purpose to understand the role of Governments and technology in the internationalisation strategies of those firms. The chapter shows that the Brazilian oil company, Petrobras, internationalised in the 1970s in order to secure oil resources, and throughout time developed technological capabilities that explain its current success and worldwide expansion. Chinese firms have risen later and are making their outward moves in order to catch up technologically with the world's leading firms.

Key words: multinational corporations, emerging economies, oil companies, technology, technological exploitation, competitive advantages.

JEL Codes: F23, O25, O38, O57

UNU-MERIT Working Papers
ISSN 1871-9872

UNU-MERIT Working Papers intend to disseminate preliminary results of the research carried out at the institute to attract comments

* This paper is under editorial revision and will be published in the forthcoming book: Costa, Duysters and Dolfma (eds): “Multinational and emerging economies: the quest for development and sustainability” (Edward Elgar). The authors would like to thank Annabel Marin, Rajeesh Kumar and other authors in the book for their comments on the earlier versions of this chapter.

1 Introduction

This chapter analyses foreign direct investments (henceforth FDI) in the oil industry from two large emerging economies, Brazil and China, with the purpose to understand the role of Governments and technology in the internationalisation strategies of those firms. Since its emergence, FDI from developing countries have been considered a different specimen from the traditional investments from advanced economies.

Chinese and Brazilian state oil companies emerged in different circumstances. The role played by their Governments in the process of internationalisation of firms is quite different. The same can be said to importance of technology in the strategy of investments' expansion. This paper attempts to highlight such differences and understand their contribution to performance and competitive position in the world market.

Brazil and China are both interesting illustrations of different moments in the internationalisation of firms from the emerging world. Two of the largest emerging economies, with high growth rates (case of China, to a lesser extent, Brazil) and with their FDI gaining momentum in the global economy. Moreover, oil sector itself is interesting due to its strategic importance for most countries nowadays, especially the high-growth ones. The high participation of the state makes this a unique sector, with peculiarities in its strategy that are worth being further analysed.

1.1 Theoretical background: FDI from emerging economies

The past years have witnessed a fast growth of foreign investments (FDI) around the world, enhanced by the process of liberalisation taking place even in previously closed economies, and facilitated by a series of new technologies of communication that sped up the process of information transfer.

Among a series of new characteristics of FDI in the end of the 20th Century and the wake of the 21st Century is the rise of FDI from emerging economies. The phenomenon, which started gaining strength in the mid- 1970s, has reached unprecedented levels in the latest years, and emerging economies already accounted for 14,3% of FDI flows in 2006 – a share that represented USD 174 billions in investments (UNCTAD, 2007)

Despite being a relatively new phenomenon, the latest figures on emerging FDI already show remarkable changing trends. While in 1990, Latin American and Southern Asian countries accounted, respectively, for 3,3 and 3,2% of global FDI outward stocks, in 2006 South, East and Southeast Asian countries account for almost 9% of stocks, while Latin America remains with the same 3% of the early 1990s (UNCTAD, 2007)

FDI from emerging economies are believed to have a peculiar set of Ownership, Location and Internalisation advantages (OLI, as proposed by Dunning, 1981, 1988), different from traditional multinationals originated from advanced countries. The Location-specific characteristics of developing countries for long played a determinant role in the types of advantages possessed by their firms, especially when considering the early investments originated from the region (Wells, 1983; Kumar, 1981; Lall, 1983).

Emerging countries' outward investments have been analysed as representing two main 'waves': the first one took place in the early 1980s and was led by Latin American countries; the second wave represents the recent trend of investments led by East Asian countries¹..

Box 1: Main characteristics of the 2 waves of FDI from emerging economies		
	Fist Wave of emerging FDI 1980s- early 1990s	Second Wave of emerging FDI 1990s – 2000s
Leading countries	Latin America, especially Brazil	East Asia - Hong Kong, Taiwan, Singapore. China on the rise
Motivation	Search for natural resources Market-seeking Especially in mature industries and resource-based industries Escaping barriers to trade	Strategic-asset seeking (esp. technological assets) Natural resources industry still important
Destination of Investment	Mostly neighbouring countries Geographic and psychological proximity are important	Neighbouring and developing countries still important Increase of investments to developed countries
Source of advantages	Mostly country-specific (L): technologies adapted to local market needs, especially small scale technologies. O advantages strongly linked to country (L) specific advantages, related to market distortions created by industrialising regimes (LA)	Increasingly firm-specific (O), result from the accumulation of technological efforts
Other characteristics	Not only old, mature technologies, but also, and most importantly, “localised technological change” (Lall, 1983).	Important role played by Government policies stimulating foreign activities

Source: adapted from Narula and Dunning, 1996

These two investment trends have specific features regarding the determinants, drivers and locations, as well as the sectors in which most investment were done, and the leading investing countries. Box 1 summarizes the main features of the first and second waves of emerging FDI.

In the early wave of investments, country-specific assets played a dominant role in determining the company’s advantages abroad. Such assets were strongly based on the development (or adaptation) of technologies to fit market specific characteristics, especially small-scale demands. Such adaptation of technologies to the availability of resources in those specific markets was what Sanjaya Lall referred as “localised technological change” (Lall, 1983), therefore rejecting the idea that firms from

developing countries had no accumulated technological capabilities due to their reliance on foreign sources of technology. The case of Brazilian multinationals in the early 1980s provides a good illustration for the existence of such localised technological change. The state oil company Petrobras relied its internationalisation strategy on the possession of deep-water extraction techniques, an asset which allowed its expansion in several markets with similar oil reserves.

In the second wave of emerging FDI, the search for specific assets, mainly technologies, have become the main drivers of these emerging multinationals. Rapid changes in the world economy and in developing countries due to institutional reforms influence the nature of a firm's advantages. A firm's 'created assets' become more important than the natural assets that are intrinsic to each country. Governments play an important role in enhancing 'created assets' and is a key characteristic of the recent wave, influencing the position of key players in this game. The case of Chinese multinationals (henceforth MNCs) is a sound example of the recent trend and of the decisive role of governments in the making of global players.

The following sections analyse investments in the oil sector by Chinese and Brazilian firms. The specificities of the oil market, the role of technology as a competitive asset and the roles of governments are approached in more detail.

2. Foreign investments in the Oil Sector and emerging countries multinationals

Oil is a unique commodity in terms of strategic importance – it is the main source of energy, an essential input to industrial production. More than 80% of world oil production takes place in developing countries, while OECD countries consume around 54% of the total produced (Aykut and Goldstein, forthcoming). In developing countries oil companies are mostly state owned, whereas in the most developed countries (the major consumers) they are privately held. Among the 50 top oil companies, 34 are state-owned, among which 20 have 100% state ownership (UNCTAD, 2007).

Investments in the sector comprise most of the motivations studied by the International Business literature: they can be resource-seeking, market-seeking or strategic-asset-seeking. In general, resource-seeking investments tend to occur in the upstream segments of the industry chain, related to exploration and extraction; market-seeking investments are on downstream segments. Strategic asset-seeking are in expansion among the oil industry, as several firms aim at cross-border mergers and acquisitions (M&A) in order to acquire important know-how and/or technology to enhance competitiveness.

The history of the oil industry has evolved towards an increasing oligopolistic structure, driven by the technical characteristics of its productive chain: a) operation in scale economies and therefore demanding high investments; b) risky investments due to the uncertainty regarding exploration prospects (Furtado and Muller, 1993).

Those features have led to a process of concentration of assets in the oil sector, result of a series of mergers and acquisitions. The verticalisation of firms has also become a strategic feature in the oil sector, due to the instability of oil prices – giving firms flexibility to rely on profits from different byproducts as one market stumbles.

The next sub-sections emphasizes the different sources of competitive advantage driving Brazilian and Chinese oil firms abroad and also sets up the role technology and the accumulation of technological capabilities play in the process.

2.1. Oil companies from Brazil: Petrobras in frank international expansion

Oil business in Brazil became of strategic importance in the early 1950s. Petrobras is a state-owned enterprise² set up in 1954 under President Vargas' democratic mandate, the only oil firm in Brazil and also the largest Brazilian company in terms of market value and revenues (Revista *Exame*, 2007). In 2006 its net revenues surpassed US\$77 billion, while net profits were around USD 2 billion. In terms of market capitalization, Petrobras was ranked in 2007 as the 6th world's largest energy company (PFC Energy,

2008). Petrobras is also one of the top multinationals from this country with external revenues of over USD 5 billion (Chevarria, 2006)

The foundation of Petrobras, along with other state-owned enterprises in basic industries (such as CVRD in iron ore and CSN in steel), was one of the cornerstones of the import substitution industrialization strategy carried out in Brazil, focussing on enabling the country to operate its industries with as little dependence from outside in terms of its basic raw materials.

With the oil crises in the 1970s, Brazil's energy policy emphasized the strategic goal of securing maximum independence from foreign oil sources. In this context Petrobras increased its strategic importance and focused on a) the development of specific technological capabilities for prospecting oil in deep waters (due to this particular location of most Brazilian reserves); b) searching for alternative energy sources. The international incursion of the company started in 1972, with the creation of Braspetro. Braspetro was the response to the oil crisis in the world economy, and a reflection of the economic dynamism of the Brazilian economy at the time (the "Economic Miracle") - which gave the firm's international quest a resource-seeking drive.

Until 1997 Petrobras had the monopoly of exploration in the Brazilian territory. However, technological and investment pressures have forced governments to open up the sector, establishing a competitive environment for oil exploration (Aikut and Goldstein, forthcoming). Henceforth the regulatory controls regarding exploration and production licenses are carried out by ANP (National Petroleum Agency) under an autarchic management.

Nowadays Petrobras is an integrated energy company with open capital that explores, produces, refines and merchandises oil and oil by-products throughout the world, in more than 100 production platforms and 16 refineries (in Brazil, Argentina and USA), being directly present in 27 countries³ (Petrobras, 2008). It has also significant investments in research, production and distribution of Ethanol, having already become an exporter.

2.2. Chinese National Oil Corporations

The oil and gas industry started late in China if compared to Brazil; it was not before the 1980s that the first national oil company, CNOOC, was set up. Nevertheless, the oil sector is one of the most internationalised in the Chinese economy, even though the first FDI took place only recently, in 1992 (Chorell *et al.*, 2005). In 2003, the oil sector was already the second most important investor (behind IT, computer and software industry), responding for 18% of Chinese FDI stocks (China Ministry of Commerce, 2004 *apud* Mirza-Giroud, 2006). Among the top 10 Chinese MNCs (in terms of foreign revenues), 3 are in the oil business (Mirza-Giroud, 2006); Chinese outward investments in the oil sector exceed USD 1 billion (UNCTAD, 2007).

As in most developing and producer countries, Chinese oil and gas industry is dominated by state-owned enterprises. In 1998 most state-owned assets were grouped into the China National Petroleum Corporation (CNPC) and the China Petroleum and Chemical Corporation (Sinopec), resulting in vertically integrated firms. The other major state sector firm is the China National Offshore Oil Corporation (CNOOC), which handles offshore exploration and production and accounts for roughly 15% of domestic production.

Despite carrying some Initial Public Offerings between 2000 and 2002, the government maintains a majority stake in the 3 companies through state-owned holding companies bearing the same name. The intention of the restructuring of company's ownership structure was to make them more similar to integrated international oil companies elsewhere⁴.

The Chinese oil companies have been taking big efforts to grow and compete in a market led by giants such as Exxon Mobil, Shell and BP. In terms of oil output, for instance, CPNC/PetroChina is close to the level of the world's leading companies, with an oil production of 822.9 million barrels and a gas production of 1,119.5 billion cubic feet (bcf) for year 2005 (OGJ, 2006), compared with the production of BP of 935.1

million barrels for oil and 3,074 bcf for gas in the same year. The other Chinese oil companies are on the same path of increasing production to top-companies levels (See Annex Table 5).

In such an effort to grow and become more competitive, internationalisation is a key move, which is granting its rewards. In 2007 Petrochina reached the top of the energy company's ranking in terms of market capitalisation, followed by the also Chinese Sinopec, which ranked 5th in the list. Chinese firms led the sector's share price growth of the year (PFC Energy, 2008).

3. Technological accumulation and international expansion

3.1. Technology in the first wave: Petrobras investing deep

It was mentioned earlier that technology assumed different roles in the internationalisation of firms from emerging economies in different moments or waves of internationalisation (Box 1). In the first wave, some companies benefited from special technological assets developed as a consequence of specific circumstances faced in home markets. Therefore, technological development was an advantaged more country than firm specific, in the context of developing countries.

Petrobras is an illustrative example of a firm from the developing world relying on its own technological accumulation – derived from specific home market needs – to boost international expansion. In the 1970s, when the country had a very low production capacity and the oil crisis came up, Petrobras had to seek abroad for new oil reserves in order to expand production.

Throughout its history, Petrobras accumulated strong capabilities in deep water extraction, for which it has been awarded several times⁵. (Dalla Costa and Pessali, 2008). Such capabilities have been the cornerstone of the company's international expansion.

The company's technological accumulation derived from the geographical circumstances of oil reserves in Brazil, which demanded special extracting expertise. In order to be able to explore deep waters, Petrobras evolved from importer of third parties' technologies to mastering them, via extensive investments in R&D in order to generate its own technologies (Bruni, 2002). Since its foundation, Petrobras has developed several research centres⁶, some of them acting in cooperation with renowned Brazilian Universities. Much of the company's research activities regards to its efforts to develop its own technology in deep water exploration and also in looking for alternative energy sources – areas in which the company is currently a world reference.

Such renown has been achieved through intensive investments in technological development. Petrobras is ranked as the 5th World Oil Company in terms of its R&D expenditures (DTI, 2006), and is a leading innovative firm in the Brazilian economy, having spent USD 399 millions in R&D activities in 2006⁷ (Petrobras, 2006; DTI, 2006).

In terms of R&D outputs, Petrobras is quite impressive, especially in the context of Brazilian firms, where it holds an outstanding position. It is the Brazilian enterprise with more patent applications, and also with more patents granted in the US Patents Office (USPTO). Up to 2005, the company was the leading patent holder in the country, having 222 patents granted from 1990-2001 at the Brazilian Patent's Office⁸ (INPI). In the period 1999-2003, Petrobras filed the 171 patent applications at the same office; it also owns 187 patents since 1976, leading among Brazilian companies and research institutes. On average, Petrobras files 80 patent claims per year and the company has already reached the 1,000th patent filed.

Recently, Petrobras has expanded its targets to developed countries with the acquisition of established refineries. In the USA, the company envisions large profits from refining its excess capacity and operating in the downstream market⁹. The company's strategy abroad has therefore widened, from obtaining new sources of raw materials to profiting from technological expertise. The international strategy aims to achieve another main

goal of the company in the next years: to become an integrated company in the energy sector as a whole – the reason why Petrobras has diversified its investments into other segments of the market. The expansion of downstream investments is aiming to expand the brand of Petrobras petrol throughout the world. The ethanol business is also promising for the company, which intends to expand in this segment. With an expected export capacity of 500 thousand cubic feet of ethanol for the year 2008, Petrobras aims to grow its capacity in 45,5% a year, reaching exports of 4,759 thousand cf by 2012.

The strategic plan of the company forecasts foreign investments of around US\$ 15 billions for the period 2008-12. Exploration and production, along with the expansion of ethanol production, are among the key projects, and further international expansion is on the way. In 2005, the company invested R\$ 7,2 billions in foreign projects (Petrobras, 2006).

The recent boom of foreign investments from Petrobras reflects a new phase in the history of the company and a change in trends in the oil market in Brazil. First, the end of the monopoly in oil exploration in 1997 and the openness to foreign investors put the firm in a new, competitive market. Since then its executives face the expansion overseas as a source of growth to the firm (Chevarria, 2006).

Second, the country's achievement of self-sufficiency in oil supply, in April 2006, after the opening of another platform for deep water exploration at the Bay of Campos, RJ, have expanded investment strategies to beyond the search for resources, but also aiming to new markets for distribution of by products, refining and logistics (downstream activities).

The benefits of the most recent boost in the company's international expansion are already felt by numbers: while in 2000 there were still no refining activities abroad, in 2002 the refining capacity was of 100,000 barrels a day (Petrobras, 2002). The refining capacity is concentrated in the Southern Cone of America, one of the strategic areas of action by the company.

In resume, the observation of Petrobras throughout time shows that the company has established its international position due to the accumulation of technological capabilities. A change in the local scenario for oil investments has fostered a further internationalisation strategy, in order to strengthen its competitive position. The following section analyses the role of technology in the expansion of Chinese firms, and reveals a quite diverse context.

3.2. Technology and Chinese firms: the quick catching up

PetroChina, CNOOC and Sinopec are still behind the global giants in their development of world-leading technologies, but are making huge efforts to catch up in terms of technological capabilities. The three Chinese state oil corporations are relatively young, if compared to Petrobras and the Big Oil companies. However, these firms have recently reached a competitive impetus that enabled them to outstand older firms in several categories and, as a result, Chinese oil firms have accumulated new technological capabilities.

In 2006, PetroChina was ranked the 6th world oil company in terms of R&D performance (DTI, 2006; see Annex Table 2); their performance in terms of patents granted at the USPTO is also impressive (Annex Table 4). Their combined R&D efforts in 2000 was about one-fifth to two-fifths of that spent by the ‘big three’; in 2006 the two industries spent together one third of the amount spent by the leading three companies. However, their combined patents’ production is still only a fraction of that of Western competitors (Nolan and Zhang, 2002). And, despite all the efforts, Chinese oil firms still face great obstacles in purchasing the R&D embedded in the products of specialist suppliers to the oil and petrochemical industry.

There are several technological gaps still to be bridged by the Chinese firms. Oil extracting machinery and oil and gas treatment equipment are either imported complete or assembled in China. Key electronic instruments and software for exploration and production are imported. In spite of holding a refining capacity comparable to the world oil majors, its technological capabilities and refining costs are still a great constraint to

the industry's competitiveness and efficiency (China Petroleum, January 1999; Chorell *et al.*, 2005). For this reason, many of Chinese investments abroad are, on top of all, seeking access to technologies that might better capacitate its firms – a motivation that aligns with the country's need to access oil reserves to comply with its rocketing demand.

Securing oil supply will be a major challenge for China in coming years. In contrast to its growing demand, China's oil output has remained relatively stable over the last five years. PetroChina's accelerating investment in exploration has so far only served to replace previous production rather than expand the oil reserve base. The company's domestic oil portfolio looks increasingly mature; meeting government security-of-supply objectives will therefore become even more onerous in future years, further stimulating overseas expansion efforts.

CNPC, for instance, has adopted as a strategy of international expansion to focus on areas of high above ground risk and mature assets, therefore avoiding head on competition with international oil companies. Its stated mission is to create a globally competitive multinational. In particular, much debate has focused on the extent to which CNPC's overseas expansion has been driven by the government's strategic goal of securing energy supply versus a desire by the company to develop itself into a global energy player (Chorell *et al.*, 2005). Overseas expansion, although headline grabbing, has been on a relatively modest scale and the company's portfolio remains dominated by conventional onshore oil production in China. In fact, CNPC has acted in a way consistent with corporate development aims, rather than simple resource capture. The problem stands in slow decision making and a risk-averse outlook, which may have been factors in its apparently conservative development moves.

In addition, if the company is to become a true international competitor it must move to fill the strategic gaps in its portfolio. Areas in which CNPC is currently entirely absent include deepwater exploration, major international gas (including LNG), and unconventional oil. The company is also severely underweight compared to the major

oil companies in offshore areas and high impact international exploration. This points to the need of further investments to improve capabilities, on top of all.

In contrast to oil, the prospects for Chinese gas production are much more promising. Several joint ventures have been undertaken in the last years in order to improve capabilities and production in this segment. Such partnerships reinforce the strategy used by China to catch up and gain market and resource access, deepening its international presence.

In resume, Chinese oil firms are aiming foreign markets in search for higher capabilities and resources, and in these terms the role of technology in the internationalisation process is very different from the case of Petrobras. In terms of its own technological capabilities, Chinese firms still have a lot to evolve and learn from their foreign counterparts, especially if the country wants to explore its reserves of oil sand – whose technologies are still to be mastered in order to make it affordable (Chorell *et al.*, 2005). The trajectories of R&D investments from Chinese oil companies (Annex Table 2) are in compliance with the growing concern of this country in becoming a big, global competitor in the oil sector.

The table below summarizes the position that both Chinese firms and Petrobras hold in terms of technological achievements. R&D and production numbers show the remarkable achievements of both countries, and point to an impressive catching up of the Chinese oil firms.

Table 1: Chinese and Brazilian Oil companies at a glance				
	Petrobras	Petrochina/CNPC	CNOOC	Sinopec
R&D expenditures (USD millions, 2006)	399,74	396,64	49,86	278,46
Patents USPTO (since 1976)	187	5	1	88
Production (million BOE, 2005)	749.6	1119.6	211	316.6
% foreign production	8.8	16.8	21.8	15.4
Position in Top Oil Companies Ranking	17	8	41	34

Sources: DTI R&D Scoreboard 2006; Oil & Gas Journal, september 2006; UNCTAD WIR 2007; USPTO

4. The role of Governments

From the observation of Petrobras' investments since its beginning, it becomes clear the importance to be attributed to a Government effort to enable the company to become a strong, technologically advanced industry in the oil sector, with the purpose of keeping the country safe of the economic imbalances originated from international oil crisis. In this sense, the role of a "Developmentalist" Government was central to the development of Petrobras competitive advantages.

On the other hand, regarding specifically to the internationalisation trends of Petrobras, there is little to be granted to a Government 'push' or any stimulating or subsidizing policies. Petrobras has become a major global player due to relying on a strong competitive asset: its deep waters exploration technologies, which were developed from the specific circumstances present in the Brazilian oil reserves. The role of the Government, in this case, had the role to foster the creation of a big firm, but its internationalisation has derived from the company's accumulated capabilities and from the global (and local) scenario for oil.

Only recently the internationalization of productive activities of Brazilian firms – as a way to boost export performance and a mean to improve competitiveness (Iglesias and Veiga, 2002) has been approached by the Government, and some programs and policies to foster a deeper international insertion have been put on the agenda for the next years (Prochnik *et al.*, 2005; Alem and Cavalcanti, 2007; Almeida, 2007).

Until recently, in Brazil the predominant vision was that foreign investments from domestic companies represented a crowding out of capital, investments and employment, and therefore were very harmful to the domestic economy. This vision has been reverted by evidence, not only in Brazil but throughout the world, that internationalised firms perform better and possess better technologies and human resources, and their exports achieve a better profitability due to these advantages (De Negri *et al.*, 2005).

The trajectory of Chinese investments have been quite diverse from the one followed by Brazilian firms. First, when Brazil was already leading the group of developing economies as the main outward investor, China was making its first steps towards a market economy. Since then, FDI from China has flourished, with a strong aim at catching up with internationalised and technologically and economically advanced economies.

In the Chinese case, Governments are the key drivers of the internationalisation process, especially because until 2003 private firms were prohibited to invest abroad. Under the “open door policy”, established in 1979, outward investments have been stimulated, but always with Government surveillance (Buckley *et al.*, 2007).

As a result, the Chinese Government plays a central role in the process of internationalisation of domestic firms. This is evident by noticing its participation on MNCs– in 2003, 43% of Chinese investors abroad were state firms (Chinese Ministry of Commerce, 2004 *apud* Mirza and Giroud, 2005). The extensive presence of the Chinese Government in investments reveal that political motivations have a role as important as economic reasons (Cai, 1999).

The Chinese Government plays an important role in Chinese “Go Global” strategy, either facilitating investment processes or providing the necessary financial support for Chinese foreign investments (Child and Rodrigues, 2005). The internationalisation strategy of Chinese firms has been in place especially since 1998. Among the policies promoting foreign investments, there are mid and long-term loans for investments and export credits; there are also aid loans and aid project funds in case of aid-receiving countries. Regarding taxation, overseas investing Chinese firms are allowed to retain foreign currency in its entirety for 5 years, during which they are exempted from income taxes (Mirza-Giroud, 2005?). Besides, the state ownership grants to these firms privileged access to capital and technology, reason why the best-performing firms are state-owned MNCs.

State owned enterprises in China are a policy instrument applied in the pursuit of a renewed insertion of the country in the recent global world, and this represents a main distinctiveness of Chinese investments.

As a consequence of the features described above, Chinese oil companies follow a general trend regarding the country's outward investments, in a strong attempt to adjust and succeed in the globalised capitalist market. To secure energy and other natural resources, along with a strong international positioning of Chinese firms - the "national champions" - is a key motivation for the Chinese Government to encourage outward investments— as part of a greater plan for the country to successfully accomplish the economic transition.

5. Concluding remarks

This chapter looked to a specific industry with an advanced level of internationalisation in two emerging countries, Brazil and China. Our purpose was to understand the role of governments and technology in the internationalisation strategy of oil firms from both countries.

Brazilian investments in oil are a good representative of the first wave of FDI from emerging countries: it relied on specific advantages derived from localized technological capabilities to develop competitive strength and establish in foreign markets. Until today, one can say that the main reason why Brazilian firms expand internationally is due to technological competences developed locally, but possible to explore in other markets. Moreover, the process of internationalisation in Brazil relies in the companies' strategies and is not related to a political or governmental project.

Chinese oil companies, on the other hand, having risen later in a competitive sector already dominated by giant players, had to develop a strategy of quickly acquiring capabilities that would enable expansion and profitability. Technology is the key asset they are searching everywhere – in foreign acquisitions, in strategic alliances established with big players and, mostly, in their expanding R&D investments. Strategic

asset seeking is the key motivation for Chinese firms to expand overseas, and behind the companies' movements abroad is a strong political will aiming to move further with development and global insertion of the economy (Fleury, 2006). Chinese firms (in the oil sector, but also in general terms) are good representatives of the recent wave of emerging FDI, highlighting both the search for strategic assets and also the Government push to internationalising (Dunning *et al.* 1997).

An important conclusion highlighted by the cases described in this chapter regards the decisive role Governments can play in the process of internationalisation of domestic enterprises – either by fostering technological development within the country, which leads to stronger competitive assets to operate abroad, or by stimulating with subsidies the foreign venture of firms, so that they can leverage key assets not available in the domestic environment. It has also shown the changing role of technology in the evolution of emerging foreign investments, and the increasing role of asset seeking investments being undertaken by some countries, like China.

The subject of the internationalisation of firms from emerging countries has a wide set of issues to be further investigated. This chapter seek to start the discussion by highlighting the role of multinationals – in this case those of developing nations – in the process of technological upgrading and economic development, which is the broad subject of this book.

References

- Alem, A. and Cavalcanti (2007), 'O BNDES e o apoio a internacionalizacao das empresas brasileiras'. In: Almeida (op. cit.)
- Almeida, A. (org.) (2007), *Internacionalizacao de empresas brasileiras – perspectivas e riscos*. Sao Paulo: Editora Campus.
- Araujo, L. (2002), China e suas três “majors” emergentes. In: *Boletim Infopetro* (www.gee.ie.ufrj.br/infopetro)
- Aykut, D. and Dilik, R. (2004), South–South FDI flows: how big are they?. *Transnational Corporations*, 13 (1).
- Aykut, D. and Goldstein, A. (2006), Developing country MNCs: south-south investments come of age. *OECD Working Paper* 257.
- Aykut, D. and Goldstein, A. (forthcoming), *FDI in Oil*. Mimeo, The World Bank and OECD.
- Battat, J. and Aykut, D. (2005), Southern Multinationals—A growing phenomenon. World Bank. Available at :[http ://rru.worldbank.org/Documents/paperslinks/southernmncs.pdf](http://rru.worldbank.org/Documents/paperslinks/southernmncs.pdf).
- Bonaglia, F. Goldstein, A., Matthews, J. (2007), Accelerated Internationalization by emerging Multinationals: the case of White Goods sector. Munich Personal RePEc Archive Paper 1485.
- Bruni P. (2002), Petrobras: estratégia e esforço tecnológico para alavancar competitividade. In: *Boletim Infopetro* (www.gee.ie.ufrj.br/infopetro)
- Cai, (1999), Outward Foreign Direct Investment: a novel dimension of China's into the Regional and Global Economy. *The China Quarterly* N. 160, pp. 856-880.
- Chevarria, D. (2006), O investimento externo da Petrobras: uma analise com base em vantagens especificas. Mphil Monography on Business Studies, UNISINOS – RS.

Child and Rodrigues (2005), The internationalisation of Chinese firms: a case for theoretical extension?. *Management and organization Review* 1:3, pp.381-410.

Chorrel, H., Nilsson, E, Chinese FDI in the Oil sector – can they be explained by the prevalent theory on FDI? . Uppsala University, Department of Economics, Thesis, autumn 2005.

Dunning, J. (1981), Explaining Outward Direct Investment of Developing Countries: in support of the Eclectic Theory of International Production. In: Kumar *et al.* (eds.) *Multinational from Developing Countries*. Lexington Books.

_____ (1988), The theory of International Production. *International Trade Journal* 3.

_____ (1988), *Explaining International Production*. London, Unwin Hyman.

_____ (2001), The Eclectic (OLI) Paradigm of International Production: past, present and future. *International Journal of the Economics of Business*, 8 (2):173-190.

Dunning J., Haesel, R., Narula, R. (1997), “Explaining the ‘new’ wave of outward FDI from developing countries: the case of Taiwan and Korea”. *MERIT Working Paper* .

Fleury, A. (2006), *China e Brasil na Economia Global: competências e estratégias empresariais*. IEA, mimeo.

Furtado, A. and Muller, N. (1993), Competitividade da Indústria de extração e refino de petróleo. *Estudo da Competitividade da Economia Brasileira*, MCT/FINEP/PADCT, Campinas, mimeo (available at: <http://200.130.9.7/publi/Compet/Default.htm> - website MCT)

Goldstein, A. (2007), *Multinational Companies from Emerging Economies: composition, conceptualization and direction in the Global Economy*. Palgrave.

Iglesias, R. and Veiga, P.M. (2002), Promoção de Exportações via Internacionalização das Firms de Capital Brasileiro. In: BNDES, *O desafio das Exportações*.

Kumar, K. and McLeod, M. (eds) (1981), *Multinationals from developing countries*. Lexington Books.

Kumar, K. (1982), Third world multinationals: a growing force in international relations. *International Studies Quarterly*, 26 (3): 397-424.

Lall, S. (ed) (1983), *The new multinationals –the spread of third world enterprises*. John and Wiley Sons.

Matthews, J. (2006), Dragon Multinationals: new players in 21st century globalization. *Asia Pacific J. Management* 23: 5-27.

Matthews, J. (2002), *Dragon Multinationals: a new model for global growth*. Oxford University Press.

Mirza, H. and Giroud, A. (2005), *Chinese Outward Foreign Investment*. Mimeo.

Nolan, P. and Zhang, J. (2002), The challenge of globalization for large firms, *UNCTAD Discussion Papers* No. 162.

Oil & Gas Journal (2006, 2005), Leading Oil and Gas companies outside the US.

Petrobras (2002), *Conference call– discussion of International Strategy*. With Investment Consultants, powered by Thomson Financial.

PFC Energy (2008), Energy 50 – The definitive annual ranking of the world's largest listed energy firms. January 2008.

Prochnik, V., Esteves, L.A., Freitas, F. (2007),

Revista EXAME (2007), *Melhores e Maiores 2007*. Editora Abril, Agosto

Ricupero, R. and Barreto, A. (2007), A importância do investimento direto estrangeiro do Brasil no exterior para o desenvolvimento socioeconômico do país. In: Almeida, A. (org) *op. cit.*

Sauvant, K. (2005), New sources of FDI: the BRICs. Outward FDI from Brazil, Russia, India and China. In : Subhash, J., *Competing with the BRICs* , Edward Elgar, UK (forthcoming).

Teixeira, A. (2006), A internacionalizacao de Empresas Brasileiras e o Papel do Estado. *XVIII Fórum Nacional- Por que o Brasil não é um país de alto crescimento?*

Tolentino(2000), Emergence and Evolution of MNCs from Brazil. In: Tolentino, *Multinational Corporations: emergence and Evolution*. London Routledge, pp. 93-122.

UNCTAD (2007), *World Investment Report 2007 – Transnational Corporations, extractive industries and development*.

UNCTAD (2006), *World Investment Report 2006 - FDI from developing and transition economies*.

UNCTAD (2005), *Firms in Developing Countries rapidly expanding foreign investment, transnational activities*. Press Release.

UNCTAD (2004), *Outward FDI from Brazil: poised to take off?*. Occasional Note.

UNCTAD, (2003), *China; an emerging FDI outward investor*. E-brief, at: <http://www.unctad.org/Templates/Webflyer.asp?docID=4295&intItemID=2068&lang=1>

Vernon, R. (1966), International Investment and International Trade in the Product Life Cycle. *The Quarterly Journal of Economics*, 80 (2):190-207.

_____(1979), The product cycle hypothesis in a new international environment. Published at: *United Nations Library on Transnational Corporation*: 46-62.

Vilella, A. (1983), *Multinationals from Brazil*. In: LALL, S. (*op. cit.*).

Wells, T.J. Jr (1983), *Third World Multinationals*. Cambridge MIT Press, Massachusetts.

Websites:

CNOOC: www.cnooc.com.cn

CNPC: www.cnpc.com.cn

Sinopec: www.sinopec.com.cn

Petrobras: www.petrobras.com.br

USPTO: www.uspto.org

DTI R&D Scoreboard: www.innovation.gov.uk/rd_scoreboard/

UNCTAD: www.unctad.org/wir

¹ For a detailed discussion of the different ‘waves’ of emerging FDI, see Dunning *et.al.*, 1997; Goldstein, 2007; Chudnovsky, 1999).

² The Government’s share stands at 56% nowadays (UNCTAD, 2007).

³ Petrobras has exploration and production facilities in 16 countries.

⁴ CNPC separated out most of its high quality assets into a subsidiary called PetroChina, and carried out its IPO of a 15% interest on both the Hong Kong and New York stock exchanges in April 2000. Sinopec also offered a 15% stake in its October 2000 IPO on the Hong Kong and New York stock exchanges. In February 2001, CNOOC held its IPO of a 27.5% stake after an earlier attempt in September 1999 was cancelled. Majors MNCs seeking China market entry were the largest subscribers: BP bought 20% of PetroChina’s offered shares, 57% of Sinopec’s shares were bought by ExxonMobil, BP, and Shell, and Shell purchased 20% of CNOOC listed shares.

⁵ The company was awarded with the “Distinguished Achievement” from the Offshore Technology Conference in 1992 and in 2001 (Dalla Costa and Pessali, 2008).

⁶ Cepetro, a centre of research and training run jointly and inside the University of Campinas-UNICAMP, has received USD 5,1 millions from the company for research projects in 2006. Cenpes, the company’s most important research centre, located within the Federal University of Rio de Janeiro (UFRJ) and in operation since 1966, has 1,800 employees (many of them with PhDs) and plays a key role in Petrobras’ corporate growth strategy.

⁷ Value in Reais announced in the company’s website: R\$ 645 millions.

⁸ In 2006 it was surpassed by a State University, UNICAMP, but remains the leader in the private sector.

⁹ The company’s interest in expanding in the downstream sector was the main reason for the acquisition of 50% of the Pasadena Refinery in Texas, in September 2006.

The UNU-MERIT WORKING Paper Series

- 2008-01 *Science, Technology and Development: Emerging concepts and visions* by Luc Soete
- 2008-02 *Reframing technical change: Livestock Fodder Scarcity Revisited as Innovation Capacity Scarcity. Part 1. A Review of Historical and Recent Experiences* by Andy Hall, Rasheed Sulaiman V., Mona Dhamankar, Peter Bezkorowajnyj & Leela Prasad
- 2008-03 *Reframing technical change: Livestock Fodder Scarcity Revisited as Innovation Capacity Scarcity. Part 2. A Framework for Analysis* by Andy Hall, Rasheed Sulaiman, V. and Peter Bezkorowajnyj
- 2008-04 *Reframing technical change: Livestock Fodder Scarcity Revisited as Innovation Capacity Scarcity. Part 3. Tools for Diagnosis and Institutional Change in Innovation Systems* by Andy Hall, Rasheed Sulaiman and Peter Bezkorowajnyj
- 2008-05 *Is Inter-Firm Labor Mobility a Channel of Knowledge Spillovers? Evidence from a Linked Employer-Employee Panel* by Mika Maliranta, Pierre Mohnen & Petri Rouvinen
- 2008-06 *Financial Constraints and Other Obstacles: Are they a Threat to Innovation Activity?* By P. Mohnen, F.C. Palm, S. Schim van der Loeff and A. Tiwari
- 2008-07 *Knowledge-based productivity in 'low-tech' industries: evidence from firms in developing countries* by Micheline Goedhuys, Norbert Janz and Pierre Mohnen
- 2008-08 *The Voyage of the Beagle in Innovation Systems Land. Explorations on Sectors, Innovation, Heterogeneity and Selection* by Martin Srholec & Bart Verspagen
- 2008-09 *Crafting Firm Competencies to Improve Innovative Performance* by Boris Lokshin, Anita van Gils & Eva Bauer
- 2008-10 *The Economics and Psychology of Personality Traits* by Lex Borghans, Angela Lee Duckworth, James J. Heckman & Bas ter Weel
- 2008-11 *Embedding Research in Society: Development Assistance Options for Supporting Agricultural Innovation in a Global Knowledge Economy* by Andy Hall
- 2008-12 *Playing in Invisible Markets: Innovations in the Market for Toilets to Harness the Economic Power of the Poor* by Shyama V. Ramani
- 2008-13 *Explaining Success and Failure in Development* by Adam Szirmai
- 2008-14 *Running The Marathon* by William Cowan, Robin Cowan and Patrick Llerena
- 2008-15 *Productivity effects of innovation, stress and social relations* by Rifka Weehuizen, Bulat Sanditov and Robin Cowan
- 2008-16 *Entrepreneurship and Innovation Strategies in ICT SMEs in Enlarged Europe (EU25)* by Kaushalesh Lal and Theo Dunnewijk

-
- 2008-17 *Knowledge Transfers between Canadian Business Enterprises and Universities: Does Distance Matter?* By Julio M. Rosa & Pierre Mohnen
- 2008-18 *Multinationals are Multicultural Units: Some Indications from a Cross-Cultural Study* by Nantawan Noi Kwanjai & J. Friso den Hertog
- 2008-19 *The Innovativeness of Foreign Firms in China* by Branka Urem, Ludovico Alcorta and Tongliang An
- 2008-20 *Beyond the emission market: Kyoto and the international expansion of waste management firms* by Ionara Costa, Asel Doranova and Geert-Jan Eenhoorn
- 2008-21 *The 'making of' national giants: technology and governments shaping the international expansion of oil companies from Brazil and China* by Flavia Carvalho and Andrea Goldstein